Polytron T.O.P 3.0

DICOM Conformance Statement

Offline Media Option

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1 Introduction

1.1 Purpose

This DICOM Conformance Statement (DCS) is written according to part PS 3.2 of [1].

The applications described in this conformance statement are the Siemens implementation of the 1024 X-Ray Angiographic Application Profile [2] and the Dynamic Cardio Review Augmented Application Profile [3] within the Polytron T.O.P. product installed with software version 3.0 or later. The Polytron T.O.P. DICOM offline media storage service implementation acts as FSC, FSU and FSR for the specified application profiles and the related SOP Class instances.

1.2 Definitions, Acronyms, and Abbreviations

DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
NEMA	National Electrical Manufacturers Association

1.3 References

[1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-12
[2] Basic Cardiac X-Ray Application Profile, Annex B, NEMA PS 3.11, 1998
[3] Dynamic Cardio Review Augmented Application Profile, Version 1.1, July 7, 1995
[4] Dynamic Cardio Review - Extension to the X-Ray Angiographic Image Object and Media Storage, Version 1.1, July 7, 1995

Note: Documents [3] and [4] were developed jointly by Siemens Medical Systems, Inc. and Philips Medical Systems, Nederland B.V.. They are available upon request.

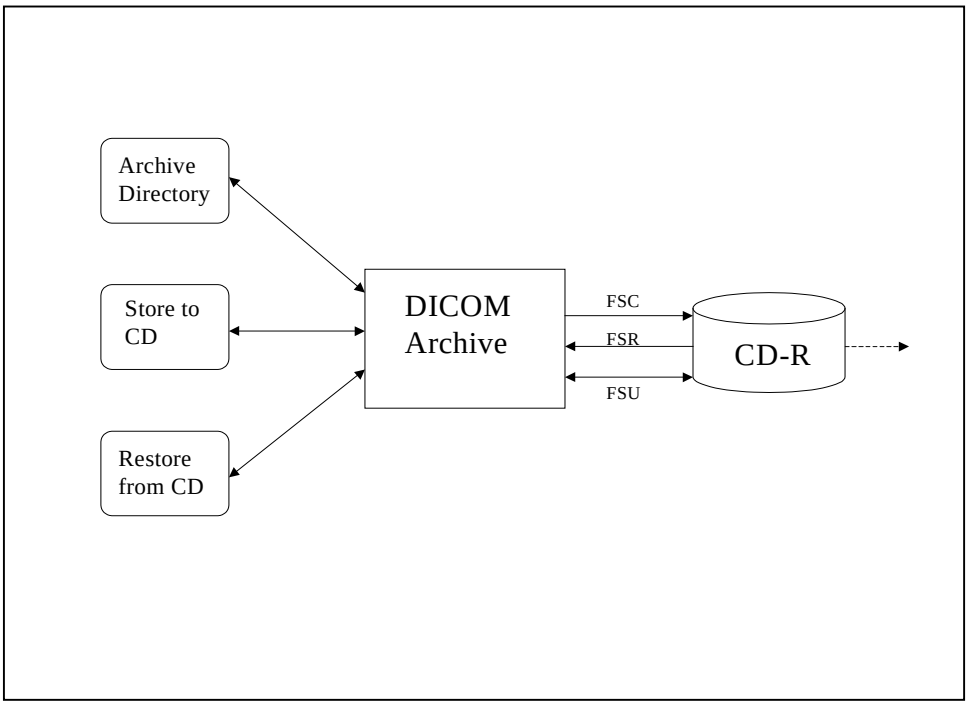
1.4 Connectivity and Interoperability

The implementation of the Siemens DICOM interface has been carefully tested to assure correspondence with this Conformance Statement. But the Conformance Statement and the DICOM standard do not guarantee interoperability of the Siemens modalities and modalities of other vendors. The user must compare the relevant Conformance Statements and if a successful interconnection should be possible, the user is responsible to specify an appropriate test suite and to validate the interoperability, which is required. A network environment may need additional functions out of the scope of DICOM.

2 Implementation Model

The Polytron T.O.P. DICOM Archive application provides creation (FSC) and update (FSU) of DICOM CD offline media according to two profiles through selection of logical device name and study content. The Dynamic Cardio Review Augmented Application Profile and the 1024 X-Ray Angiographic Profile are the two profiles supported. Cardiac images will be stored using the Dynamic Cardio Review Augmented Application Profile if the CD-M (optional) logical device is selected. Cardiac images will be stored using the 1024 X-Ray Angiographic Profile if the CD-M option is available, but the CD-R (optional) or DICOM NET (optional) logical device is selected. Angiographic images will always be stored using the 1024 X-Ray Angiographic Profile. For CD offline media written by a Siemens Polytron T.O.P. or ACOM T.O.P. only, according the above profiles, the FSR and FSU role is supported for import and update of the related SOP instances respectively.

2.1 Application Data Flow Diagram



The Polytron T.O.P. DICOM Archive application will serve as an interface to the CD-R offline medium device. It provides interfaces for the Real World Activities of an Archive Directory, Store to CD and Restore from CD.

The DICOM Archive application will support the 120mm CD-R medium.

The DICOM NET logical device is selected when the final destination of the store will be a DICOM network. A specialized Network Interface Unit (NIU) is used to bridge the CD-R interface of the Polytron T.O.P. to that of a DICOM network. Only the store function is currently implemented for the NIU. The NIU's DICOM Conformance Statement should be consulted in addition to this document when using this option.

2.2 Functional Definition of Application Entities

The Polytron T.O.P. DICOM Archive can perform the following functions:

Archive Directory:

The DICOMDIR is parsed for SOP Instances valid to the Application Profiles supported. The resulting information is shown in a combined Patient/Study data list. Only CDs written by a Siemens Polytron T.O.P. or ACOM T.O.P. are supported.

Store to CD:

Depending on the logical device (CD-R, CD-M or DICOM NET)[1] selected, SOP instances can be stored according to the referring Application Profile. With CD-M the extended profile for Dynamic Cardio Review is applied to Cardiac images and the 1024 X-Ray Angiographic Application profile is applied to Angiographic images. For the CD-R and DICOM NET logical device the 1024 X-Ray Angiographic Application profile is applied to Angiographic and Cardiac images. With new media a new file-set is created. It is also possible to update an existing file-set with new SOP Instances provided the file-set was created by a Siemens Polytron T.O.P. or ACOM T.O.P. The scope of the store request can be of Study, marked Scenes and marked Photofile images. All Images stored using older Polytron T.O.P. hardware and Photofile Images are written uncompressed using the Explicit VR Little Endian transfer syntax and, therefore, do not adhere to the 1024 X-Ray Angiographic profile.

Restore from CD:

By selecting a Patient/Study the restore from CD can be initiated from the Archive Directory. Only the lossless and uncompressed SOP instances will be used for restore transfers. The scope of the restore request can be of Study, Scenes and Photofile images.

2.3 Sequencing of Real World Applications

Not applicable.

2.4 File Meta Information Options

The Implementation Class UID is:

1.3.12.2.1107.5.4.1.2

and a Source Application Entity Title of

"SIEMENS:DCR 1.60"

is used. The “1.60” represents the current version number (Siemens proprietary).

[1] CD-R, CD-M and DICOM NET are options of the Polytron T.O.P.

3 AE Specifications

3.1 CD Disc Application Specification

The Polytron T.O.P. DICOM Archive Application provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed in Table 3.1-1

Table 3.1-1 Application Profiles, Activities, and Roles for DICOM Archive

Application Profiles Supported	Real World Activity	Role	SC Option
AUG-XABC-DYNAMIC-CD	Archive Directory	FSR	Proprietary*
STD-XA1K-CD	Store to CD	FSU	Proprietary*
		FSC	Interchange
	Restore from CD	FSR	Proprietary*

*: Proprietary is used to indicate the Real World Activity is only supported for Siemens offline media.

3.1.1 File Meta Information for the Application Entity

A Source Application Entity Title of “SIEMENS: DCR 1.60” is used when a Store to CD operation is performed. The “1.60” represents the current version number (Siemens proprietary).

3.1.2 Real-World Activities for this Application Entity

3.1.2.1 Real-World Activity: Archive Directory

The Polytron DICOM Archive Application acts as a FSR using the Interchange option when reading the media directory from CD disc. This is always done when a disc with an existing file-set is inserted. As a consequence media removal will clear the Archive Directory list.

The Polytron T.O.P. Archive application only supports reading Siemens discs written by the Polytron T.O.P. or ACOM T.O.P. as determined by the Source Application Entity Title. The Polytron T.O.P. DICOM Archive application presents only those images formatted to the 1024 X-Ray Angiographic Application Profile (STD-XA1K-CD). Data on a CD disc conforming to the Dynamic Cardio Review Augmented Application Profile (AUG-XABC-DYNAMIC-CD) can also be loaded. The images encoded in lossy compressed Transfer Syntaxes will then be ignored.

3.1.2.1.1 Application Profiles for Archive Directory

See table 3.1-1 for the Application Profiles listed that invoke this Application Entity for the Archive Directory RWA.

3.1.2.2 Real-World Activity: Store to CD

The DICOM Archive application acts as FSU (for media with existing DICOM file-set, not closed) or FSC (media not initialized) using the interchange option when requested to store SOP Instances from the Polytron T.O.P. to local Archive (offline medium). Depending on the logical device selected (CD-R, CD-M, DICOM NET) and the content of the study, SOP instances can be stored according to the referring Application Profile.

The Polytron T.O.P. Archive application only supports update of Siemens discs written by the Polytron T.O.P. or ACOM T.O.P. as determined by the Source Application Entity Title.

3.1.2.2.1 Application Profiles for Store to CD

See table 3.1-1 for the Application Profiles listed that invoke this Application Entity for the Store to CD RWA.

3.1.2.3 Real-World Activity: Restore from CD

The DICOM Archive application acts as FSR using the interchange option when requested to read SOP Instances from the medium into the Polytron T.O.P. online storage.

The Polytron T.O.P. Archive application only supports reading Siemens discs written by the Polytron T.O.P. or ACOM T.O.P. as determined by the Source Application Entity Title. With the Dynamic Cardio Review Augmented Application Profile the lossy encoded images cannot be restored. For image quality reasons only the lossless compressed and uncompressed (Explicit VR Little Endian) SOP instances are used for restore transfers.

3.1.2.3.1 Application Profiles for Restore from CD

See table 3.1-1 for the Application Profiles listed that invoke this Application Entity for the Restore from CD RWA.

4 Augmented and Private Profiles

4.1 Augmented Profiles

With the logical device CD-M selected, the Polytron T.O.P. DICOM Archive application will use the Dynamic Cardio Review Augmented Application Profile (AUG-XABC-DYNAMIC-CD) for Cardiac images.

All private attributes added due to that augmentation will be identified by a Private Creator string "CARDIO-D.R. 1.0".

4.1.1 AUG-XABC-DYNAMIC-CD Application Profile

This Profile is an augmentation of the Basic Cardiac Application Profile and adds components (new SOP Class and directory record attributes) to facilitate Dynamic Review of the images stored on the interchange medium.

4.1.1.1 SOP Class Augmentations

The following SOP Classes and related Transfer Syntaxes are added by this augmentation:

Table 4.1.1.1-1 AUG-XABC-DYNAMIC-CD SOP Classes and Transfer Syntax additions

SOP Class Name	SOP Class UID	Transfer Syntax Definition	Transfer Syntax UID
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Baseline (Process 1); Lossy JPEG 8-bit image compression	1.2.840.10008.1.2.4.50

4.1.1.2 Directory Augmentations

The Dynamic Cardio Review Augmented Application Profile utilizes the same requirements for the Directory Information in the DICOMDIR as the STD-XABC-CD Application Profile with the addition that lossy compressed images shall be identified by Directory Records of type PRIVATE.
Directory Records of type IMAGE and Lossy Directory Record of type PRIVATE contain, in addition to the keys required by the STD-XABC-CD Application Profile, the keys specified in the following table:

Table 4.1.1.2-1 Additional DICOMDIR Keys for AUG-XABC-DYNAMIC-CD

Key Attribute	Tag	Directory Record Type	Type	Notes
Image Sequence Number	[0021,xx13]	IMAGE, PRIVATE-Lossy Directory Record	2	The sequence number of this image in the Study, as stored on the medium.
Alternate Image Sequence	[0009,xx40]	IMAGE	1C	Required if the associated Lossy Directory Record exists.
Source Image Sequence	[0008,2112]	PRIVATE-Lossy Directory Record	1	Identifies the lossless compressed image.
Icon Image Sequence	[0008,0200]	IMAGE	1	

The Lossy Directory Record has a Private Record UID [0004,1432] of 1.3.46.670589.7.1.1.3

Please refer to Appendix: Supported Attributes section for more information.

4.1.1.3 Other Augmentations

None

4.2 Private Profiles

None

5 Extension, Specializations, Privatizations of SOP Classes and Transfer Syntaxes

The Polytron T.O.P. utilizes the SOP class extension [4] created to support the Dynamic Cardio Review Augmented Application Profile.

The list of supported attributes for the SOP Classes according to the Standard Application Profiles can be found in the Appendix, Table A-1.

Polytron T.O.P. systems with older processor boards, SCPs, do not support image compression. All image data on these systems are stored uncompressed. Likewise, Photofile images are never stored compressed. In these cases the Images are stored in DICOM format using Explicit VR Little Endian (EVRLE) transfer syntax. These images are identified in the DICOMDIR by Directory Records of type PRIVATE since they do not follow the 1024 X-Ray Angiographic Profile.

The uncompressed 1024 Angiography Directory Record has a Private Record UID [0004,1432] of 1.3.12.2.1107.5.4.1.3

The uncompressed Photofile Directory Record has a Private Record UID [0004,1432] of 1.3.12.2.1107.5.4.1.4
NOTE: In previous versions of the Polytron T.O.P. application (Applicaton Entity Title of “SIEMENS:DCR 1.50”) the uncompressed Photofile Directory Record had a Private Record UID of 1.3.12.2.1107.5.4.1.1 The UID was changed to reflect corrections made to the method of pixel storage in the Image object to address DICOM conformance.

6 Configuration

It can be configured what logical CD device is selectable in the Polytron T.O.P. user interface. Configuring the CD-R, CD-M, or DICOM Net device options is depending on appropriate Hardware compression support.

A Polytron T.O.P. system can be installed with a hardware configuration that supports JPEG compression (CCP board) or installed with an older hardware configuration that does not support JPEG compression (SCP board). Older hardware configurations do not support the CD-M or DICOM Net logical device.

7 Character Sets

The Polytron T.O.P. DICOM Archive Application supports the use of the Latin 1 character set (Specific Character Set = “ISO_IR 100”).

Appendix: Supported Attributes

DICOMDIR

Attribute Name	Tag	Value
File-Set ID	[0004,1130]	SMS_DYNAMIC_CARD
Offset of the First Directory Record	[0004,1200]	
Offset of the Last Directory Record	[0004,1202]	
File-set Consistency Flag	[0004,1212]	0
Directory Record Sequence	[0004,1220]	
>Offset of the Next Directory Record	[0004,1400]	
>Record In-use Flag	[0004,1410]	
>Offset of Referenced Lower Level Directory Entity	[0004,1420]	
>Directory Record Type	[0004,1430]	PATIENT, STUDY, SERIES, IMAGE, PRIVATE
PATIENT KEYS		
Specific Character Set	[0008,0005]	ISO_IR 100
Patient's Name	[0010,0010]	
Patient ID	[0010,0020]	
Patient's Birth Date	[0010,0030]	
Patient's Sex	[0010,0040]	
STUDY KEYS		
Specific Character Set	[0008,0005]	ISO_IR 100
Study Date	[0008,0020]	
Study Time	[0008,0030]	
Accession Number	[0008,0050]	
Referring Physicians Name	[0008,0090]	
Study Description	[0008,1030]	
Private Creator	[0009,0010]	
Private Data	[0009,1008]	
Study Instance UID	[0020,000D]	
Study ID	[0020,0010]	
SERIES KEYS		
Specific Character Set	[0008,0005]	ISO_IR 100
Modality	[0008,0060]	XA
Institution Name	[0008,0080]	
Institution Address	[0008,0081]	
Performing Physician's Name	[0008,1050]	
Series Instance UID	[0020,000E]	
Series Number	[0020,0011]	1
IMAGE KEYS		
Referenced File ID	[0004,1500]	
Referenced SOP Class UID in File	[0004,1510]	1.2.840.10008.5.1.4.1.1.12.1
Referenced SOP Instance UID in File	[0004,1511]	

Referenced Transfer Syntax UID in File	[0004,1512]	1.2.840.10008.1.2.4.70 (JPEG Lossless)
Image Type	[0008,0008]	
Private Creator	[0009,0010]	CARDIO-D.R. 1.0
Alternate Image Sequence	[0009,1040]	Only if Dynamic Image is present
>Referenced SOP Class UID	[0008,1150]	
>Referenced SOP Instance UID	[0008,1155]	
Frame Time	[0018,1063]	
Referenced Image Sequence	[0008,1140]	Only if Image Type indicates BIPLANE
>Referenced SOP Class UID	[0008,1150]	
>Referenced SOP Instance UID	[0008,1155]	
Positioner Motion	[0018,1500]	STATIC
Positioner Primary Angle	[0018,1510]	
Positioner Secondary Angle	[0018,1511]	
Image Number	[0020,0013]	
Number of Frames	[0028,0008]	
Calibration Image	[0050,0004]	
Icon Image Sequence	[0088,0200]	
>Samples per Pixel	[0028,0002]	1
>Photometric Interpretation	[0028,0004]	MONOCHROME2
>Rows	[0028,0010]	128
>Columns	[0028,0011]	128
>Bits Allocated	[0028,0100]	8
>Bits Stored	[0028,0101]	8
>High Bit	[0028,0102]	7
>Pixel Representation	[0028,0103]	0
>Pixel Data	[7FE0,0010]	
PRIVATE (Lossy Image)		
Private Record UID	[0004,1432]	1.3.46.670589.7.1.1.3
Referenced File ID	[0004,1500]	
Referenced SOP Class UID in File	[0004,1510]	1.2.840.10008.5.1.4.1.1.12.1
Referenced SOP Instance UID in File	[0004,1511]	
Referenced Transfer Syntax UID in File	[0004,1512]	1.2.840.10008.1.2.4.50 (JPEG Lossy)
Image Type	[0008,0008]	
Source Image Sequence	[0008,2112]	
>Referenced SOP Class UID	[0008,1150]	
>Referenced SOP Instance UID	[0008,1155]	
Frame Time	[0018,1063]	
Positioner Motion	[0018,1500]	STATIC
Positioner Primary Angle	[0018,1510]	
Positioner Secondary Angle	[0018,1511]	
Image Number	[0020,0013]	
Number of Frames	[0028,0008]	
Calibration Image	[0050,0004]	
PRIVATE (Uncompressed Image)		
Private Record UID	[0004,1432]	1.3.12.2.1107.5.4.1.3

Referenced File ID	[0004,1500]	
Referenced SOP Class UID in File	[0004,1510]	1.2.840.10008.5.1.4.1.1.12.1
Referenced SOP Instance UID in File	[0004,1511]	
Referenced Transfer Syntax UID in File	[0004,1512]	1.2.840.10008.1.2.1 (Explicit VR Little Endian)
Image Type	[0008,0008]	
Frame Time	[0018,1063]	
Referenced Image Sequence	[0008,1140]	Only if Image Type indicates BIPLANE
>Referenced SOP Class UID	[0008,1150]	
>Referenced SOP Instance UID	[0008,1155]	
Positioner Motion	[0018,1500]	STATIC
Positioner Primary Angle	[0018,1510]	
Positioner Secondary Angle	[0018,1511]	
Image Number	[0020,0013]	
Number of Frames	[0028,0008]	
Calibration Image	[0050,0004]	
Icon Image Sequence	[0088,0200]	
>Samples per Pixel	[0028,0002]	1
>Photometric Interpretation	[0028,0004]	MONOCHROME2
>Rows	[0028,0010]	128
>Columns	[0028,0011]	128
>Bits Allocated	[0028,0100]	8
>Bits Stored	[0028,0101]	8
>High Bit	[0028,0102]	7
>Pixel Representation	[0028,0103]	0
>Pixel Data	[7FE0,0010]	
PRIVATE (Photofile Image)		
Private Record UID	[0004,1432]	1.3.12.2.1107.5.4.1.4 Note: was 1.3.12.2.1107.5.4.1.1 in 2.5 – 2.9
Referenced File ID	[0004,1500]	
Referenced SOP Class UID in File	[0004,1510]	1.2.840.10008.5.1.4.1.1.12.1
Referenced SOP Instance UID in File	[0004,1511]	
Referenced Transfer Syntax UID in File	[0004,1512]	1.2.840.10008.1.2.1 (Explicit VR Little Endian)
Image Type	[0008,0008]	
Image Number	[0020,0013]	<Zero Length>
Number of Frames	[0028,0008]	

X-RAY ANGIOGRAPHIC IMAGE

Attribute Name	Tag	Value
Specific Character Set	[0008,0005]	ISO_IR 100
Image Type	[0008,0008]	ORIGINAL\PRIMARY\SINGLE PLANE or ORIGINAL\PRIMARY\SINGLE PLANE\SINGLE A or ORIGINAL\PRIMARY\SINGLE

		PLANE\SINGLE B or ORIGINAL\PRIMARY\BIPLANE A or ORIGINAL\PRIMARY\BIPLANE B
SOP Class UID	[0008,0016]	1.2.840.10008.5.1.4.1.1.12.1
SOP Instance UID	[0008,0018]	1.3.12.2.1107.5.4.1.<id>.<yyyymmdd>.<hhmmss>.<N>
Study Date	[0008,0020]	<yyyymmdd>
Image Date	[0008,0023]	<yyyymmdd>
Study Time	[0008,0030]	<hhmmss>
Image Time	[0008,0033]	<hhmmss>
Accession Number	[0008,0050]	<from RIS or Zero length>
Modality	[0008,0060]	XA
Manufacturer	[0008,0070]	SIEMENS
Institution Name	[0008,0080]	<from system configuration>
Institution Address	[0008,0081]	Zero length
Referring Physician's Name	[0008,0090]	<max. 64 char, "^" delimiter, from RIS>
Study Description	[0008,1030]	Zero length
Performing Physicians Name	[0008,1050]	<from input, default from RIS>
Manufacturer's Model Name	[0008,1090]	POLYTRON-TOP if all image data was generated on the Polytron, omitted if data came from ACOM
Referenced Image Sequence	[0008,1140]	Only if Image Type indicates BIPLANE
>Referenced SOP Class UID	[0008,1150]	1.2.840.10008.5.1.4.1.1.12.1
>Referenced SOP Instance UID	[0008,1155]	
Private Creator	[0009,0010]	POLYTRON-SMS 2.5
Private Data 1	[0009,1002]	Private data stream
Private Data 2	[0009,1003]	Private data stream
Private Data 3	[0009,1004]	Private data stream
Private Data 4	[0009,1010]	Filter values (native:sub)
Private Data 5	[0009,1011]	Window brightness, only if subtracted
Private Data 6	[0009,1012]	Window contrast, only if subtracted
Patient's Name	[0010,0010]	<max. 64 char, "^" delimiter, or from RIS>
Patient ID	[0010,0020]	<max 64 char, or from RIS>
Patient's Birth Date	[0010,0030]	<yyyymmdd, or from RIS>
Patient's Sex	[0010,0040]	M or F or O (or from RIS)
Patient's Weight	[0010,1030]	<user input, or from RIS> (in kilograms)
KVP	[0018,0060]	<peak KV used> (KV)
Device Serial Number	[0018,1000]	
Software Version(s)	[0018,1020]	Software version with link date and time: "V3.0 yyyy-mm-dd hh:mm:ss"
Frame Time	[0018,1063]	(ms)
Exposure	[0018,1152]	(mAs)
Radiation Setting	[0018,1155]	GR
Positioner Motion	[0018,1500]	STATIC
Positioner Primary Angle	[0018,1510]	(degrees)

Positioner Secondary Angle	[0018,1511]	(degrees)
Private Creator	[0019,0010]	CARDIO-D.R. 1.0
Maximum Frame Size	[0019,1030]	
Study Instance UID	[0020,000D]	1.3.12.2.1107.5.4.1.<id>.<yyyymmdd>,<hhmmss>.<N> or from RIS
Series Instance UID	[0020,000E]	1.3.12.2.1107.5.4.1.<id>.<yyyymmddhhmmss>
Study ID	[0020,0010]	System generated
Series Number	[0020,0011]	1
Image Number	[0020,0013]	Scene number
Patient Orientation	[0020,0020]	(always zero length)
Image Comments	[0020,4000]	<scene name>
Private Creator	[0021,0010]	CARDIO-D.R. 1.0
Image Sequence Number	[0021,1013]	
Samples per Pixel	[0028,0002]	1
Photometric Interpretation	[0028,0004]	MONOCHROME2
Number of Frames	[0028,0008]	<actual number of frames>
Frame Increment Pointer	[0028,0009]	00181063
Rows	[0028,0010]	512, 1024
Columns	[0028,0011]	512, 1024
Pixel Spacing	[0028,0030]	If available from auto calibration
Bits Allocated	[0028,0100]	8, 16
Bits Stored	[0028,0101]	8, 10
High Bit	[0028,0102]	7, 9
Pixel Representation	[0028,0103]	0
Pixel Intensity Relationship	[0028,1040]	LIN or LOG
Window Center	[0028,1050]	Default value of 128/512 for subtracted cardiac/angio scenes
Window Width	[0028,1051]	Default value of 100/400 for subtracted cardiac/angio scenes
Recommended Viewing Mode	[0028,1090]	SUB or NAT
Lossy Image Compression	[0028,2110]	00
Modality LUT Sequence	[0028,3000]	If Pixel Intensity Relationship is LOG
>LUT Descriptor	[0028,3002]	256, 0, 8 or 1024, 0, 16
>Modality LUT Type	[0028,3004]	US
>LUT Data	[0028,3006]	
Mask Subtraction Sequence	[0028,6100]	
>Mask Operation	[0028,6101]	NONE or AVG_SUB
>Mask Frame Numbers	[0028,6110]	
>Mask Sub Pixelshift	[0028,6114]	
Private Creator	[0029,0010]	CARDIO-D.R. 1.0
Edge Enhancement Sequence	[0029,1000]	
>Private Creator	[0029,0010]	CARDIO-D.R. 1.0
>Convolution Kernel Size	[0029,1001]	
>Convolution Kernel Coefficients	[0029,1002]	

>Edge Enhancement Gain	[0029,1003]	
Edge Enhancement Gain*	[0029,1003]	
Requesting Physician	[0032,1032]	<Zero length or from RIS>
Request Attributes Sequence	[0040,0275]	<only if patient from RIS>
>Scheduled Procedure Step ID	[0040,0009]	<from RIS or no Sequence>
>Requested Procedure ID	[0040,1001]	<from RIS or no Sequence>
Calibration Image	[0050,0004]	<Zero length>
Private Creator	[0089,0010]	POLYTRON-SMS 2.5
Private Data	[0089,1010]	
Pixel Data	[7FE0,0010]	

* This attribute is additionally included outside the Edge Enhancement Sequence only when storing to DICOM Net.

DYNAMIC IMAGE

Attribute Name	**Tag**	**Value**
Specific Character Set	[0008,0005]	ISO_IR 100
Image Type	[0008,0008]	DERIVED\PRIMARY\SINGLE PLANE or DERIVED\PRIMARY\SINGLE PLANE\SINGLE A or DERIVED\PRIMARY\SINGLE PLANE\SINGLE B or DERIVED\PRIMARY\BIPLANE A or DERIVED\PRIMARY\BIPLANE B
SOP Class UID	[0008,0016]	1.2.840.10008.5.1.4.1.1.12.1
SOP Instance UID	[0008,0018]	1.3.12.2.1107.5.4.1.<id>.<yyyymmdd>.<hhmmss>.<N>
Study Date	[0008,0020]	<yyyymmdd>
Image Date	[0008,0023]	<yyyymmdd>
Study Time	[0008,0030]	<hhmmss>
Image Time	[0008,0033]	<hhmmss>
Accession Number	[0008,0050]	<from RIS or Zero length>
Modality	[0008,0060]	XA
Manufacturer	[0008,0070]	SIEMENS
Institution Name	[0008,0080]	<from system configuration>
Institution Address	[0008,0081]	Zero length
Referring Physician's Name	[0008,0090]	<max. 64 char, "^" delimiter, from RIS>
Study Description	[0008,1030]	Zero length
Performing Physicians Name	[0008,1050]	<from input, default from RIS>
Manufacturer's Model Name	[0008,1090]	POLYTRON-TOP if all image data was generated on the Polytron, omitted if data came from ACOM
Referenced Image Sequence	[0008,1140]	Only if Image Type indicates BIPLANE
>Referenced SOP Class UID	[0008,1150]	1.2.840.10008.5.1.4.1.1.12.1
>Referenced SOP Instance UID	[0008,1155]	

Private Creator	[0009,0010]	POLYTRON-SMS 2.5
Private Data 1	[0009,1002]	Private data stream
Private Data 2	[0009,1003]	Private data stream
Private Data 3	[0009,1004]	Private data stream
Private Data 4	[0009,1010]	Filter values (native:sub)
Private Data 5	[0009,1011]	Window brightness, only if subtracted
Private Data 6	[0009,1012]	Window contrast, only if subtracted
Patient's Name	[0010,0010]	<max. 64 char, "^" delimiter, or from RIS>
Patient ID	[0010,0020]	<max 64 char, or from RIS>
Patient's Birth Date	[0010,0030]	<yyyymmdd, or from RIS>
Patient's Sex	[0010,0040]	M or F or O (or from RIS)
Patient's Weight	[0010,1030]	<user input, or from RIS> (in kilograms)
KVP	[0018,0060]	<peak KV used> (KV)
Device Serial Number	[0018,1000]	
Software Version(s)	[0018,1020]	Software version with link date and time: "V3.0 yyyy-mm-dd hh:mm:ss"
Frame Time	[0018,1063]	(ms)
Exposure	[0018,1152]	(mAs)
Radiation Setting	[0018,1155]	GR
Positioner Motion	[0018,1500]	STATIC
Positioner Primary Angle	[0018,1510]	(degrees)
Positioner Secondary Angle	[0018,1511]	(degrees)
Private Creator	[0019,0010]	CARDIO-D.R. 1.0
Maximum Frame Size	[0019,1030]	
Study Instance UID	[0020,000D]	1.3.12.2.1107.5.4.1.<id>.<yyyymmdd>,<hhmmss>.<N> or from RIS
Series Instance UID	[0020,000E]	1.3.12.2.1107.5.4.1.<id>.<yyyymmddhhmmss>
Study ID	[0020,0010]	System generated
Series Number	[0020,0011]	1
Image Number	[0020,0013]	Scene number
Patient Orientation	[0020,0020]	(always zero length)
Image Comments	[0020,4000]	<scene name>
Private Creator	[0021,0010]	CARDIO-D.R. 1.0
Image Sequence Number	[0021,1013]	
Samples per Pixel	[0028,0002]	1
Photometric Interpretation	[0028,0004]	MONOCHROME2
Number of Frames	[0028,0008]	<actual number of frames>
Frame Increment Pointer	[0028,0009]	00181063
Rows	[0028,0010]	512
Columns	[0028,0011]	512
Pixel Spacing	[0028,0030]	If available from auto calibration
Bits Allocated	[0028,0100]	8
Bits Stored	[0028,0101]	8
High Bit	[0028,0102]	7

Pixel Representation	[0028,0103]	0
Pixel Intensity Relationship	[0028,1040]	LIN or LOG
Window Center	[0028,1050]	Default value of 128 for subtracted cardiac scenes
Window Width	[0028,1051]	Default value of 100 for subtracted cardiac scenes
Recommended Viewing Mode	[0028,1090]	SUB or NAT
Lossy Image Compression	[0028,2110]	01
Modality LUT Sequence	[0028,3000]	If Pixel Intensity Relationship is LOG
>LUT Descriptor	[0028,3002]	256, 0, 8
>Modality LUT Type	[0028,3004]	US
>LUT Data	[0028,3006]	
Mask Subtraction Sequence	[0028,6100]	
>Mask Operation	[0028,6101]	NONE or AVG_SUB
>Mask Frame Numbers	[0028,6110]	
>Mask Sub Pixelshift	[0028,6114]	
Private Creator	[0029,0010]	CARDIO-D.R. 1.0
Edge Enhancement Sequence	[0029,1000]	
>Private Creator	[0029,0010]	CARDIO-D.R. 1.0
>Convolution Kernel Size	[0029,1001]	
>Convolution Kernel Coefficients	[0029,1002]	
>Edge Enhancement Gain	[0029,1003]	
Edge Enhancement Gain*	[0029,1003]	
Requesting Physician	[0032,1032]	<Zero length or from RIS>
Request Attributes Sequence	[0040,0275]	<only if patient from RIS>
>Scheduled Procedure Step ID	[0040,0009]	<from RIS or no Sequence>
>Requested Procedure ID	[0040,1001]	<from RIS or no Sequence>
Calibration Image	[0050,0004]	<Zero length>
Private Creator	[0089,0010]	POLYTRON-SMS 2.5
Private Data	[0089,1010]	
Pixel Data	[7FE0,0010]	

* This attribute is additionally included outside the Edge Enhancement Sequence only when storing to DICOM Net.

PHOTOFILE

Attribute Name	**Tag**	**Value**
Specific Character Set	[0008,0005]	ISO_IR 100
Image Type	[0008,0008]	DERIVED\PRIMARY\SINGLE PLANE\SINGLE A or DERIVED\PRIMARY\SINGLE PLANE\SINGLE B
SOP Class UID	[0008,0016]	1.2.840.10008.5.1.4.1.1.12.1
SOP Instance UID	[0008,0018]	1.3.12.2.1107.5.4.1.<id>.<yyyymmdd>.<hhmmss>.<N>

Study Date	[0008,0020]	<yyyymmdd>
Image Date	[0008,0023]	<yyyymmdd>
Study Time	[0008,0030]	<hhmmss>
Image Time	[0008,0033]	<hhmmss>
Accession Number	[0008,0050]	<from RIS or Zero length>
Modality	[0008,0060]	XA
Manufacturer	[0008,0070]	SIEMENS
Institution Name	[0008,0080]	<from system configuration>
Institution Address	[0008,0081]	Zero length
Referring Physician's Name	[0008,0090]	<max. 64 char, "^" delimiter, from RIS>
Study Description	[0008,1030]	Zero length
Performing Physicians Name	[0008,1050]	<from input, default from RIS>
Manufacturer's Model Name	[0008,1090]	POLYTRON-TOP if all image data was generated on the Polytron, omitted if data came from ACOM
Private Creator	[0009,0010]	POLYTRON-SMS 2.5
Private Data 1	[0009,1002]	Private data stream
Private Data 2	[0009,1004]	Private data stream
Private Data 3	[0009,1006]	Private data stream
Patient's Name	[0010,0010]	<max. 64 char, "^" delimiter, or from RIS>
Patient ID	[0010,0020]	<max 64 char, or from RIS>
Patient's Birth Date	[0010,0030]	<yyyymmdd, or from RIS>
Patient's Sex	[0010,0040]	M or F or O (or from RIS)
Patient's Weight	[0010,1030]	<user input, or from RIS> (in kilograms)
KVP	[0018,0060]	<peak KV used, zero length> (KV)
Device Serial Number	[0018,1000]	
Software Version(s)	[0018,1020]	Software version with link date and time: "V3.0 yyyy-mm-dd hh:mm:ss"
Exposure	[0018,1152]	<Zero Length> (mAs)
Radiation Setting	[0018,1155]	GR
Positioner Motion	[0018,1500]	STATIC
Positioner Primary Angle	[0018,1510]	(degrees)
Positioner Secondary Angle	[0018,1511]	(degrees)
Study Instance UID	[0020,000D]	1.3.12.2.1107.5.4.1.<id>.<yyyymmdd>,<hhmmss>.<N> or from RIS
Series Instance UID	[0020,000E]	1.3.12.2.1107.5.4.1.<id>.<yyyymmddhhmmss>
Study ID	[0020,0010]	System generated
Series Number	[0020,0011]	1
Image Number	[0020,0013]	<Zero Length>
Patient Orientation	[0020,0020]	(always zero length)
Samples per Pixel	[0028,0002]	1
Photometric Interpretation	[0028,0004]	MONOCHROME2
Number of Frames	[0028,0008]	1
Rows	[0028,0010]	1024

Columns	[0028,0011]	1024
Pixel Spacing	[0028,0030]	If available from auto calibration
Bits Allocated	[0028,0100]	16
Bits Stored	[0028,0101]	10
High Bit	[0028,0102]	9
Pixel Representation	[0028,0103]	0
Pixel Intensity Relationship	[0028,1040]	DISP
Window Center	[0028,1050]	512
Window Width	[0028,1051]	1024
Recommended Viewing Mode	[0028,1090]	NAT
Requesting Physician	[0032,1032]	<Zero length or from RIS>
Request Attributes Sequence	[0040,0275]	<only if patient from RIS>
>Scheduled Procedure Step ID	[0040,0009]	<from RIS or no Sequence>
>Requested Procedure ID	[0040,1001]	<from RIS or no Sequence>
Calibration Image	[0050,0004]	<Zero length>
Private Creator	[0089,0010]	POLYTRON-SMS 2.5
Private Data	[0089,1010]	
Pixel Data	[7FE0,0010]	